

# Cam Checker: Quick Start

The Blowby logger will display blowby flow ifor your blowby sensor on it's LCD screen. There are several options which you can select to customize the logger for your particular needs.

The screen features are shown below:



Press the Options button for menu to select features and customize the logger for your needs or engine being tested.

Label for which centerline is displayed either "In" or "Ex".

Press the InExDet button to scroll through the calculated results for the last test you recorded. Displayed are Intake Centerline, Exhaust Centerline and Details (like lift, duration, events, etc.)

Template Name, shown here as the default "Template 1". Templates are combinations of Rocker Arm Ratios and Lash settings to calculate what the cam lobe specs are if you measure what the valve retainer is doing.

Start turning over the engine with the starter and press the Record button to start recording data. The screen will show "Recording Data". Once enough data has been recorded, the screen will show "Calculating". When finished, the screen will show the Intake Centerline, like shown here. Other options are then available as described in this document.

Press the Off button to turn off the logger to shut it down and save the battery.

Battery Indicator. If moving "+", then battery is charging via USB cable. If "[----]" then battery is fully charged. If "[ - ]" battery very low and may turn off power quickly to maintain battery power and save any recorded data. Typically all data is saved if power is lost except the raw readings for the Profile File.

## Setting up your Logger for the First Time

- 1) Press Options, then Reset Defaults to restore all the logger's settings to their standard settings and use right side buttons to choose Yes, then press Select button. (NOTE: Once you have set up your logger, do **NOT** Reset Defaults as you may loose some special settings you like.)
- 2) Press Options, then Calibration. Choose Lift Sensor 1 and Lift Sensor 2 and enter the calibration numbers below. These are typically written on the side of the sensors. Connectors for the Lift Sensor s are marked by colored shrink tubing. The "Dead Band Cts" is for the rotary sensor. The calibration for the Pressure and Rotary sensors are not critical. It is recommend you use the defaults loaded by pressing "Reset Defaults".

_____	Lift Sensor 1 (red) *	_____	Lift Sensor 2 (yellow) *
_____	Pressure (blue)	_____	Rotary (green)
_____	Dead Band Cts		

Scroll through the choices, then press the Select button when your selection is being pointed to. Then press Back button (upper left) to return to the list of Options.

\* Numbers written on lift sensors will have 3 digits, like 344. When you choose a calibration number in logger, it will put ".000" in front of it, so 344 on lift sensor gets entered as .000344.

- 3) In Options, click on Valve Train, then Edit Template. Here you can set the Rocker Ratio and Lash you wan the program to use for calculating what the cam lobe specs are (typical of most cam card specs) when you measure what the valve retainer is doing. That means you have placed the linear sensors on the valve retainer. NOTE: If you place the linear sensors directly on the tappet or pushrod (components which move directly with the cam lobe), you should set 1 for the Rocker Amr Ratio and 0 for the Lash. You would also set 1 for the Rocker Amr Ratio and 0 for

- the Lash if you want to measure what the valve is doing, instead of the cam lobe.
- 4) Click on Back 2 times to return to the Main Screen. You have set the most critical parameters to obtain good results.
  - 5) To run a test, you must install the 4 sensors on the engine:
    - Screw the pressure sensor connection into the cylinder you will be testing.
    - Install the lift sensors on the retainers (or pushrod or tappet, or some other item which moves with the valve motion). Fig 1, also showing optional disk magnet on steel retainer to make a larger "target".
    - Install the rotary sensor on most any item which turns with the engine crankshaft, like a pulley or belt. Fig 2.
  - 6) Crank the engine over with the starter for a few seconds, then press the Record button. The screen will show "Recording Data". Once enough data has been recorded, the screen will show "Calculating". When finished, the screen will show the Intake Centerline. By pressing the "InExDet" button in the lower left you can scroll through Intake Centerline, Exhaust Centerline and Details (like lift, duration, events, etc.).
  - 7) You can upload these results to a PC via the USB cable and the free Performance Trends software. Check the program's help screens and documentation for more information on this program.

Notes:

- You will charge your logger via the USB cable to any computer's USB port.
- You can upload your recorded data to the free Cam Checker software on Performance Trends website or from CD.
- The logger will shut down automatically if it senses it is not moving and/or the buttons have not been pressed, to save battery power.
- The LCD backlight will shut down automatically if it senses it is not moving and/or the buttons have not been pressed, to save battery power. The time to keep the light on can be modified in the Options menu.
- The logger will mark each recorded data set with date and time. You must set this clock when you first get your logger. The time and data are only available when you upload the records to the PC. These features are available only by the free software.
- If you press power switch on side of logger to turn it off to save battery power (which also reboots the microprocessor), the screen may still stay on if you have USB power plugged in. You will loose the cam profile data (all raw readings) for the last profile measured when you reboot.



Tips on Hardware Installation:

- The most likely reason for data not repeating is the rotary sensor slipping. Be sure it is firmly pressing on the belt or pulley.
- You want the bracket holding the lift sensor to be very stiff and secure. If it is bending or moving slightly, that can easily change the lift and readings .030" or more, which also affects duration and events measurements.
- If you are measuring a cam with hydraulic followers, the high force of the valve springs can force the lifters to leak down, changing the effective lash and the measured results. The solution is to measure directly on the pushrod with the rocker arm removed, or replace the followers on the lobes being measured with solid followers.
- If you are only interested in cam timing (centerlines), you can place the lift sensors on the rockers (especially if the rocker arms have large flat surfaces like those pictured above).
- You can place large disk magnets on the valve spring retainers (if they are steel) to provide a large flat surface for the lift sensors.

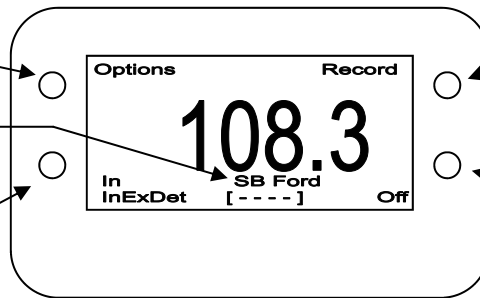
# Cam Checker Options Menu Operation

## Main Screen Display

Press for Options  
Menu shown below

Template name for Valve  
Train (rocker ratio and  
lash)

To rezero pressure sensor



Press to start recording data

Press to turn off logger and  
save battery power.

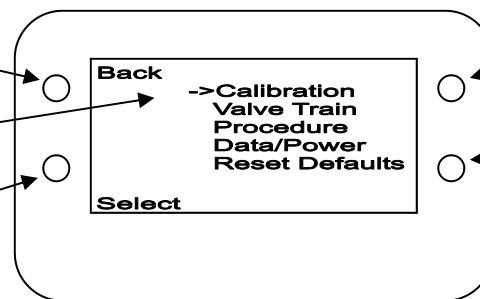
Reset button on side (for  
"rebooting" logger, seldom used)

## Options Menu

Press to return to  
Main Screen

Cursor Arrow showing  
current selection

Press this button to select  
option or value currently  
selected by the cursor  
arrow.



This button moves arrow  
cursor up.

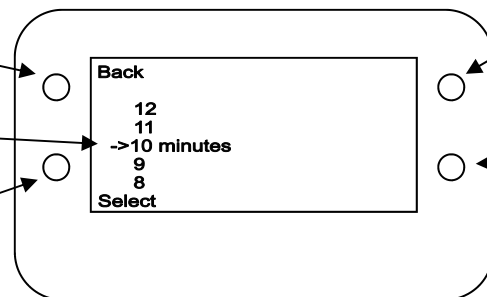
This button moves arrow  
cursor down

## Backlight Time Menu (showing how picking an option works)

Press to return to  
Options list **WITHOUT**  
keeping your change

Cursor Arrow showing  
current selection

Press this button to select  
option or value currently  
selected by the cursor  
arrow and return to Options  
Screen with your selection  
saved.



This button moves arrow  
cursor up in list.

This button moves arrow  
cursor down in list

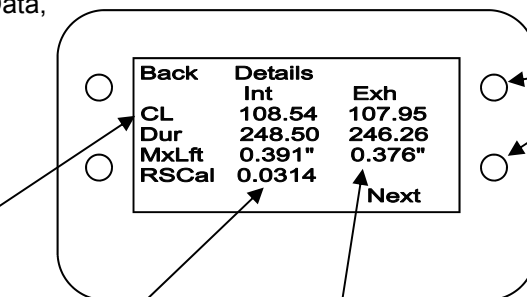
Tapping these buttons move  
cursor 1 step at a time.  
Holding these buttons move  
cursor quickly through list.

## Playback Mode for Recorded Data

At main screen, press Options,  
then Data/Power, then Recorded Data,  
then Record # for saved data.

Data can also be uploaded  
to a PC via the free  
Performance Trends software.

Labels for the record data.



Press these buttons to  
display Next or Prev (previous)  
screen of detailed data.

Intake results

Exhaust Results

## Cam Checker Options Menu Operation, cont

### Explanation of some menu options:

**Calibration, Lift Sensor 1, Lift Sensor 2, Pressure, Rotary, Dead Band Cnts** This is where you can enter the calibrations for your particular sensors. The Lift Sensor calibrations are critical to enter correctly for all data except cam timing. Pressure and Rotary sensors are not critical at this time; use the default settings. Dead Band Counts (the counts missing in the rotary encoder as the values drop from maximum to minimum when the rotary encoder goes beyond a full revolution) is somewhat critical and is typically 225 (the default).

**Valve Train, Current Template** Displays the current template name of template being used. A “template” is a combination Intake and Exhaust Rocker Arm Ratio and Lash Options (4 values). These numbers are used to calculate the cam’s actual *lobe* values if you measure what the *valve* is doing. If you place the lift sensors directly on the follower or pushrod which is directly on the lifter, you should use a template where the rocker ratios are 1 and the lash is 0. The Template names can only be changed in the PC software.

**Valve Train, Open Template** Lets you pick a different template.

**Valve Train, Edit Template** Lets you change the Rocker Ratios or Lash settings. This can also be easily done with the PC software.

**Procedure, Units** Lets you change between inches and mm units. Note: The lift sensor calibrations are always in inches.

**Procedure, Lift Events** Lets you set the lift where duration and events are determined. Note: These are calculated as what is happening on the cam lobe, like most cam grinders report. When you measure the valve motion, you need the correct template settings of rocker ratio and lash.

**Procedure, Step Size** Lets you set the change in rotary sensor bits to change before a new reading is taken. Depending on the RPM of the rotary sensor, many times the records have much bigger steps than specified here. This minimum step would only be used if the RPM was very slow. (mostly for future options)

**Procedure, Test Method** Lets you set the change the method by which the engine is being rotated. Keep it set to “On Stand” at this time. (mostly for future options)

**Data/Power, Backlight/Pwr** Lets you specify options to save on the battery life.

- Backlit On With lets you specify if motion of the logger or pressing a button will turn on the backlight.
- Backlight Time Lets you specify how long the backlight will stay on after being activated.
- InactivePwrOff lets you specify how long the box can have no motion or button press or USB communications before the box “goes to sleep” to save on power.
- Low Bat PwrOff lets you specify how long before the box goes to sleep when the battery power is very low.

**Data/Power, Recorded Data** Lets you display the results for the individual records.

**Data/Power, Delete Data** Lets you erase all the individual records.

**Data/Power, Raw Readings** Lets you add the data readings for the 4 sensors to the main screen display. Typically you will only display these readings if you are troubleshooting the system.

**Reset Defaults** Puts the logger back to all factory settings. This can be very useful if you think you have made mistakes with the settings. NOTE: After this you must reinstall your calibrations. It does give you an option to save Template changes.